27^{th} TJIMO

Alexandria, Virginia

Round: **Practice Guts**

Set 1

Problem 1. Alfredo rolls a fair, six-sided die. What is the probability that he rolls an odd number?

Problem 2. The expression $(2x-3)\times(5x+2)$ can be written as ax^2+bx+c. Find $a+b+c$.

Problem 3. Simplify the fraction $\frac{\frac{12}{33}}{\frac{24}{35}}$.

Problem 4. How many factors does $2^4\cdot 3^2\cdot 4^3$ have?

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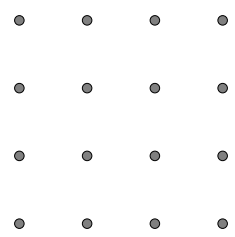
Set 2

Problem 5. Triangle ABC has $AB = 25$ and $BC = 7$. If $\angle C = 90°$, find the length of AC.
Problem 6. Let $f(x) = 7x - \sqrt{x} + 3$. Compute $f(4)$.
Problem 7. How many squares have all 4 vertices in the array of 16 points below?



Problem 8. Express $0.\overline{47} = 0.47474747\ldots$ as a simplified fraction.

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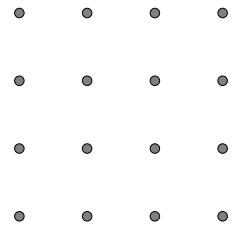

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Set 3

Problem 9. Compute 25×316484.
Problem 10. What is the largest prime factor of $25^2 - 14^2$?
Problem 11. Three consecutive odd integers add up to 27. If I subtract 1 from each of these numbers and multiply them all by 6, what is their new sum?
Problem 12. Rectangle A has side lengths 5 and 4, and Rectangle B has side lengths 7 and 2. What percentage of Rectangle A's area is Rectangle B's area?

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